UNHIN

UNIVERSAL HEALTH INFORMATION NETWORK

www.unhin.org

TRANSFORM GLOBAL HEALTH

Powered By Transform Global Health

v0.4

Healthcare is a Universal Human Right

Everyone must have access to proper healthcare, just as they must have access to natural resources such as air and water. We must therefore **not view implementing Electronic Health Records (EHR) as an enterprise problem**, rather we must implement a Universal Health Information Network (UNHIN) that is completely open source, free to use, highly secure and available to all individuals and organizations.

WHAT IS THE UNHIN?

The current approach for implementing Electronic Health Records (EHR) is failing. The global expenditure for EHR will exceed $33.4 billion per year by 2025 for an approach that does not empower patients, alienates and frustrates physicians, and is prohibitively expensive. Developing nations cannot afford to implement the current, enterprise-based EHR systems, and it is economically unsustainable for the few advanced countries that have implemented it widely.

The Universal Health Information Network (UNHIN) is taking a fresh approach to solve this problem, applying decentralized computing, including blockchain technology to establish an open, secure and universally available network for collecting, securing and managing health information. It overcomes the numerous challenges and high costs related to managing health information to transform the way Electronic Health Records (EHR) are implemented. It empowers patients and physicians, reduces physician overheads, reduces costs, makes EHR available globally to all geographical regions and economic levels, and provides managed access to health information that does not exist today. It facilitates advancing healthcare globally, providing improved outcomes, and services that are not possible with current infrastructure and technology.

The UNHIN implements a custom, healthcare focused blockchain protocol that allows patients to own, manage and control their health information and maintains anonymity of healthcare transactions. It takes a unique approach that implements an open network at a universal scale that allows anyone to participate in it while keeping their information completely secure. It does this by applying cryptography, decentralized computing and blockchain technology to implement data protection and security levels that far exceed prevalent technology and policy standards such as HIPAA. Furthermore, it applies blockchain to create its own community driven economy that incentivizes people and healthcare organizations to participate in the network.

The UNHIN will be universally available to everyone for free, completely open source, wholly community driven, economically self-sustaining, and independent of any commercial enterprise. Providing a truly universal health information network that is ever present and freely available to everyone, and all individuals and organizations can use it for managing health information. This is in contrast to the traditional approach of implementing EHR software as enterprise systems and then finding ways to integrate these enterprise systems to achieve interoperability, which is costing billions of dollars every year with limited results and is proving to be prohibitively expensive and problematic to implement and operate.

WHY BLOCKCHAIN?

While cryptocurrency is Blockchain technology's most recognized application, it can be applied to numerous other fields. At its core it provides a technology that allows implementing:

1. decentralized, peer-to-peer networks,
2. that incentivize people to participate in them,
3. have their own network-managed economy, allowing the network to be open source while still paying for its development, operation and maintenance,
4. and provide a cryptographically secured, trust-free environment,
5. that allows people to transact with each other without requiring any trusted intermediary

It is this technology foundation in combination with additional decentralized computing innovations that enables us to implement the Universal Health Information Network (UNHIN) as a universally available, completely open network that is independent of any commercial enterprise. The UNHIN will be an information network that is truly owned and operated by the global community. It will have its own independent economy via a 'native token'. Individuals and organizations will use this native token to access services in the network and will be rewarded via this token for contributing to the network and providing services on it.

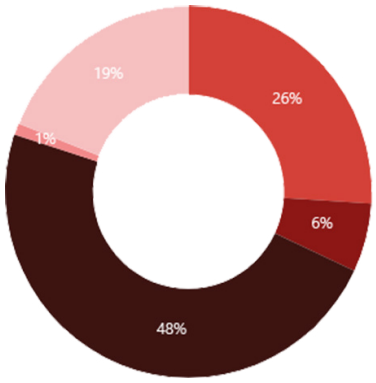
UNHIN is implementing a healthcare specific blockchain protocol that applies cryptography to implement data protection and security levels that far exceed prevalent technology and policy standards such as HIPAA. Health records are completely protected so that only their individual owners can access them. A blockchain based digital rights management (DRM) system and smart contracts enable data authorization, allowing individuals to have complete control over their health information and securely grant fine grained access to other individuals, physicians or healthcare organizations as required.

Even in Today's Information Age, there is **no Established Network for Health Information**

In today's connected world, where we have come to expect communication and easy access to information of all types, health information **is not managed or handled properly** and people **do not have access to their health information.** Underprivileged and developing nations simply **cannot afford to implement** prevalent Electronic Health Record (EHR) systems, and advanced nations have **severely flawed implementations** that frustrate physicians and do not engage patients or provide them access to their own information.

Advanced countries like the USA have implemented provider (medical providers, clinics, hospitals, etc.) centric electronic health record (EHR) systems that are built from the perspective of billing and practice management, so that health information is owned and managed by providers, and patients need to request and even pay for access to their own information and can have to wait days or weeks to receive it. These are highly expensive systems implemented by healthcare organizations as siloed enterprise systems. Often a single hospital can have separate EHR systems for separate departments that do not communicate with each other, let alone across organizations. The EHR records are structured mainly for handling billing and practice management, and are a black box to patients, who cannot access their own information.

The current approach to EHR is not providing the expected level of patient engagement and is also causing stress and dissatisfaction for medical staff. As an example, physician burnout is affecting about 50% of practicing doctors in USA with EHR implementations taking the blame as the most significant factor. Physicians are overburdened by overheads, spending most of their time in administrative tasks and documenting their work in EHR systems that are cumbersome and difficult to use.



26%
DIRECT CLINICAL FACE TIME WITH PATIENT

6%
FACE TIME WITH STAFF

48%
EHR AND DESK WORK

1%
ADMINISTRATIVE TASKS

19%
OTHER TASKS

Underprivileged and developing nations around the world simply cannot afford to implement electronic health records, so they have limited digitization, having to rely on physically filed records. Hospitals and clinics that are implementing EHRs are putting in place stand alone, limited medical billing and practice management systems that have no interoperability and do not provide patient access to information at all.

The current approach for implementing Electronic Health Records (EHR) is failing!

Healthcare organizations have traditionally implemented EHR software as enterprise systems for their organizations, or departments. They use different software packages (as many as **1000+ different products**), and different versions of the same software packages that are tailored to implement the requirements of a specific enterprise.

Once implemented for each enterprise, organizations or consortiums then spend **enormous amounts of time, effort and money** in trying to make these enterprise systems communicate with each other, which is made **enormously complex** due to differences in data structures, software, and also the complexity of the information that comprise EHRs.

This approach is **tremendously problematic and incredibly expensive**, with the global EHR expenditure expected to reach **$33.4** Billion per year by 2025! A level of expenditure that is hard for advanced countries to maintain and is simply not affordable for developing and underprivileged nations.

Furthermore, these EHR systems are not providing desired results. They are **not patient centric**, rather they are designed more from the perspective of billing, claims and other enterprise processes for hospitals and other healthcare providers. This means that **patients cannot access or manage their own health information** and the EHRs **don't interoperate across providers or even across departments at the same hospital.** This impacts **continuity of care for patients, disrupts productivity,** and **frustrates and burdens physicians.**

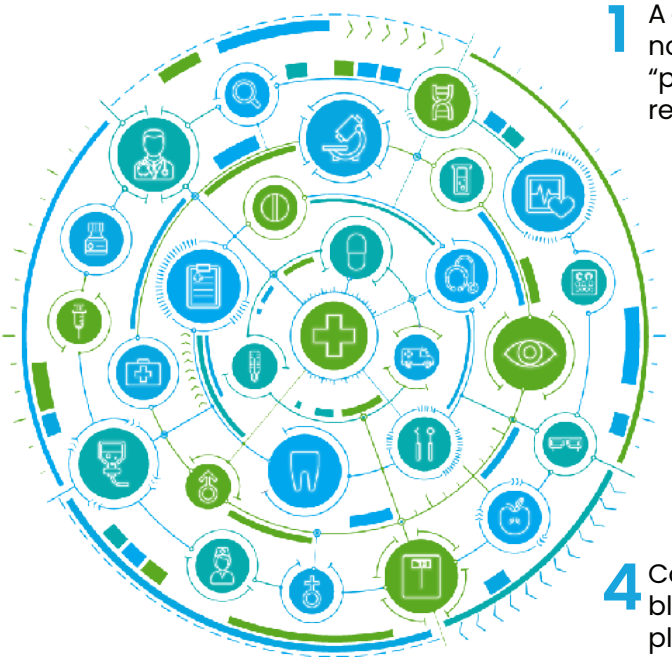
THE UNHIN APPROACH

The UNHIN takes a fresh look at how Electronic Health Records should be implemented; what is required to empower patients by implementing patient centric Electronic Health Records (EHR) at scale; what is required to make EHR universally available to everyone, across all regions and all economic levels; how can EHRs be secured beyond all prevalent security standards; how can EHR be managed via a self-sustaining, community driven network in a vendor neutral manner, free of any commercial enterprise, driving towards the goal of enabling "healthcare as a universal human right"; how to implement this network in such a way that existing hospital and practice management systems can plug into it to drive rapid adoption – allowing the existing healthcare ecosystem to transform into a patient centric model that will enable effective, patient centric care and solve the problem of interoperability by providing each individual with the ability to assimilate, own and manage their health information.

TRANSFORMATIVE TECHNOLOGY

The UNHIN combines lessons learned from prior EHR implementations with the latest developments in technology to achieve all of the above goals. The UNHIN implements a **decentralized storage network** that cryptographically shreds and secures all information so that it is suitable for **securely storing health information**. It combines this with a **healthcare specific blockchain protocol** that maintains **patient privacy** while allowing the network to be **self-sustaining and community driven** with its **own network economy driven by the UNHIN token**. It integrates the blockchain with a **decentralized Digital Rights Management (DRM) system** that allows each individual to manage their health information and provide **authorized access to healthcare providers** as required. It implements a masternode network within its blockchain that enables healthcare providers and researchers to **request patient information on a global scale** that is simply not possible today and implements a **sub-network for emergency health-information** to allow emergency care workers to **securely access life-saving information for individuals** in time of need.

To achieve such a network, UNHIN implements its own blockchain with several innovations and features required to support the storage and management of health information to meet and exceed prevalent standards such as HIPAA. These innovations include:



1. A completely "proof of stake" based blockchain with multiple novel proofs including "proof of identity", "proof of ownership", "proof of authorization", "proof of de-identification", "proof of redundancy"

2. Implementing a decentralized storage network suitable for healthcare that cryptographically secures and shreds all information, mathematically proving that each node can not have any identifiable information

3. Implementing a blockchain network that obfuscates all transactions while keeping a public network, thus preventing anyone from identifying any healthcare transactions. Only i ndividuals can access their healthcare transactions

4. Combining the decentralized storage network and blockchain to implement a patient-centric decentralized platform in which individuals own and manage their health records

5. Implementing protocols for masternodes to provide several healthcare-oriented services such as providing healthcare organizations and their practitioners with secure access to emergency records, requesting people for access to their information for medical studies, providing aggregated de-identified health information to support medical studies, and more

ROADMAP

2018 Q2

- Identify key hypothesis and approach for UNHIN
- Draft Whitepaper abstract for UNHIN
- Identify the UNHIN architecture and technology components
- Review whitepaper abstract with key advisers

2018 Q3

- Form core project team with key leads and advisers
- Prototype the UNHIN blockchain and decentralized storage network
- Establish the UNHIN as a Transform Global Health project
- Initiate developent of UNHIN platform website

2018 Q4

- Release UNHIN Platform website
- Identify approach for UNHIN to transform current healthcare ecosystem into a patient centric model
- Identify selected hospitals and clinics in developing nations for implementing open source Hospital Information Systems
- Design decentralized Digital Rights Management (DRM) system
- Extend the UNHIN whitepaper
- Identify detailed plans for developing the UNHIN
- Start promoting the UNHIN on Transform Global Health and social media platforms

2019 Q1

- Release detailed whitepaper for UNHIN
- Implement open source Hospital Information Systems for selected hospitals in developing nations
- Prototype integrated UNHIN with blockchain, decentralized storage network and decentralized DRM platform
- Extend adviser network across various regions globally
- Launch funding campaign with ICO

2019 Q2

- Complete ICO
- Launch full scale development for the UNHIN
- Identify 10 additional hospitals in developing nations for implementing open source Hospital Information Systems
- Initiate biweekly video update for project on Transfor Global Health youtube channel

2019 Q3

- Develop UNHIN platform components including the UNHIN Healtchare Blockchain, Decentralized Storage Network, Decentralized Digital Rights Management System and UNHIN Identity Management System, Individual Health Wallet and Physician Wallet
- Implement open source Hospital Information Systems at identified hospitals in developing nations
- Develop UNHIN adapters for various open source Hospital Information Systems

2019 Q4

- Launch Testnet for the UNHIN, including the UNHIN Healtchare Blockchain, Decentralized Storage Network, Decentralized Digital Rights Management System and UNHIN Identity Management System, Individual Health Wallet and Physician Wallet
- Integrate UNHIN managed Hospital Information System implementations (10+) with UNHIN
- Make UNHIN masternodes available to hospital systems. Hospitals can invest in running Masternodes, which will provide ongoing passive income to hospitals while supporting UNHIN network services
- Identify commercial Hospital Information system vendor relationships to connect with the UNHIN

2020 Q1

- Conduct detailed testing of UNHIN managed Hospital Information System implementations with the UNHIN
- Release UNHIN adapters for open source Hospital Information Systems and open source electronic Health Record Systems - OpenMRS, OpenEMR, Bahmni, HospitalRun, Nosh, Solismed, One Touch EMR
- Initiate development of the emergency health information sub-network
- Work with commercial Hospital Information System vendors and providers using these systems to connect with the UNHIN

2020 Q2

- Make the UNHIN live with Hospital Information Systems (10+) managed by UNHIN
- Support open source Hospital Information system implementations globally in connecting with the UNHIN
- Support commercial Hospital Information system implementations globally in connecting with UNHIN

2020 Q3

- Release emergency health information sub-network
- Support the largescale transformation of healthcare ecosystem to patient centric model on the UNHIN
- Expand support for commercial Hospital Information System vendors
- Connect Hospital Information Systems globally with UNHIN
- Initiate development of the UNHIN Hospital Information System as a service platform that will use the UNHIN token for all services

2020 Q4

- Continue expansion of UNHIN and its masternode network
- Continue connecting Hospital Information Systems globally to UNHIN
- Expand UNHIN to usecases in drug manufacturing, medical supply chain, clinical studies, drug and treatment trials, the identification of health and medical trends, healthcare coverage and claims management

2021 Q1

- Continue expansion of UNHIN and its masternode network
- Continue connecting Hospital Information Systems globally to UNHIN
- Expand UNHIN to usecases in drug manufacturing, medical supply chain, clinical studies, drug and treatment trials, the identification of health and medical trends, healthcare coverage and claims management

2021 Q2

- Continue expansion of UNHIN and its masternode network
- Continue connecting Hospital Information Systems globally to UNHIN
- Release UNHIN Hospital Information System as a Services, available globally to healthcare providers
- Expand UNHIN to usecases in drug manufacturing, medical supply chain, clinical studies, drug and treatment trials, the identification of health and medical trends, healthcare coverage and claims management

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